

Advice on Main Hawaiian Islands Deep-7 Bottomfish Catch¹

Fisheries Research and Monitoring Division
Pacific Islands Fisheries Science Center

-- Report dated February 17 based on data accessible through February 14, 2011 --

This report provides an updated estimate of the cumulative catch of Deep-7 bottomfish in the main Hawaiian Islands along with forecasts of the date when the cumulative catch is expected to reach the total allowable catch (TAC) of 254,050 lbs in 2011 (hereafter 'intersection date'). For more information see <http://www.hawaiibottomfish.info/>

Method

The estimate of the current cumulative catch and the forecast of intersection date are based on commercial fishermen's catch reports submitted to the Hawaii Division of Aquatic Resources (HDAR). These reports are due on the 10th of each month for fishing in the prior month, although more frequent reporting is encouraged. Monthly reporting enables us to calculate only one new, complete estimate of past catches per month. So the bottomfish forecast of intersection date is always based on a projection of future catch from the cumulative catch of a prior month (This differs from the forecast of intersection date provided for bigeye tuna in the longline fishery, which uses logbook catch data reported at the end of each trip. Thus for bigeye, projections of future catch are made from a cumulative catch total that is reasonably complete for a date 2.5 weeks before the most recent data are received; see PIFSC Internal Report IR-10-015.) Several bottomfish forecast updates can still be provided per month, including an early forecast when the estimate of the prior month's cumulative catch is preliminary and later forecasts when the catch data are more complete. Catch predictions will be too low by the amount that the prior month's estimated cumulative catch is incomplete (by an unknown amount), and forecasted intersection dates will be earlier if there is an increase in the previous month's cumulative catch. If more fishermen engage in more frequent reporting in the future, it may become possible to update the forecast's starting points more frequently and improve accuracy of the forecast; at present that is not possible.

Much like the bigeye tuna forecast, the bottomfish catch projection is based on average catches by month during the previous five fishing seasons (September-August, 2005-2010, Figure 1). The forecast simply adds the monthly average of catches from previous years to the most recent estimate of cumulative catch to get the projected cumulative total for each projected month. Between the end of one month and the next month, values are interpolated. In April 2008 and April 2010, bottomfishing was closed for the latter part of the month. Therefore, for those months, baseline catches were raised to account for fish that would have been caught if the fishery had remained open and the adjusted estimates were used in the forecast. And because the fishery was most often closed after

¹ PIFSC Internal Report IR-11-002
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April during the past 5 seasons, no forecast is possible past April using this model. If needed in future, a model based on data from more prior years will need to be developed that can forecast for later months. It is good to use the most recent baseline available when it is suspected that fishing behavior may have changed over time, including changes in response to presence of the catch quota. The projections of catch and forecasts of intersection dates are uncertain because actual values of future catch will deviate from the past average values.

The green lines on the graph of previous seasons (Figure 1) and on the forecast graph (Figure 2) show the current cumulative catch in the 2010-2011 fishing season through the most complete month's data. Figure 1 also shows the monthly average catches from the 5 prior seasons. The 2010-2011 season's catch has been much higher than average. The blue line in Figure 2 shows a projection of "future" catch, i.e., catch beyond the reporting period, extending from the starting point (when the reported catch was relatively complete, given in Table 1) up to the TAC (red line) of 254,050 lbs. The forecasted intersection date is the date when the projected cumulative catch line meets the TAC line. Also shown in Figure 2 are the upper and lower 95%, 90%, and 75% prediction limits (PL) for the projected cumulative catch. Prediction limits are like confidence limits but for a new season (i.e. 2010-2011, n=1). The illustrated PL's are one-tailed to address the risk that the catches exceed (upper limits) or do not reach (lower limits) the forecast.

To keep the risk of exceeding the TAC at or below 5% (approximately), one could, hypothetically, take action to stop the fishery on the date when the forecast upper 95% PL reaches the TAC. Stopping the catch on the intersection date indicated by an upper PL would have the consequence that a portion of the TAC equal to the upper PL (on the stop date) would not be caught, if the actual catch trend ends up matching the projected cumulative catch. This potential uncaught amount is only an average estimate. The magnitude of the estimated uncaught portion of the TAC can be reduced by taking a larger risk that the TAC will be exceeded, such as by using the intersection date corresponding to the projected upper 90% PL (10% risk) or 75% PL (25% risk). At any risk level, the magnitude of the PL increases with the length of time from the last reliable catch data.

Each forecast report assumes that the data used represent the complete catch (or nearly complete catch) through the end of a specified prior month (the month listed in Table 1). In this issue of the report, the specified prior month is January 2011.

Graphs and Tables

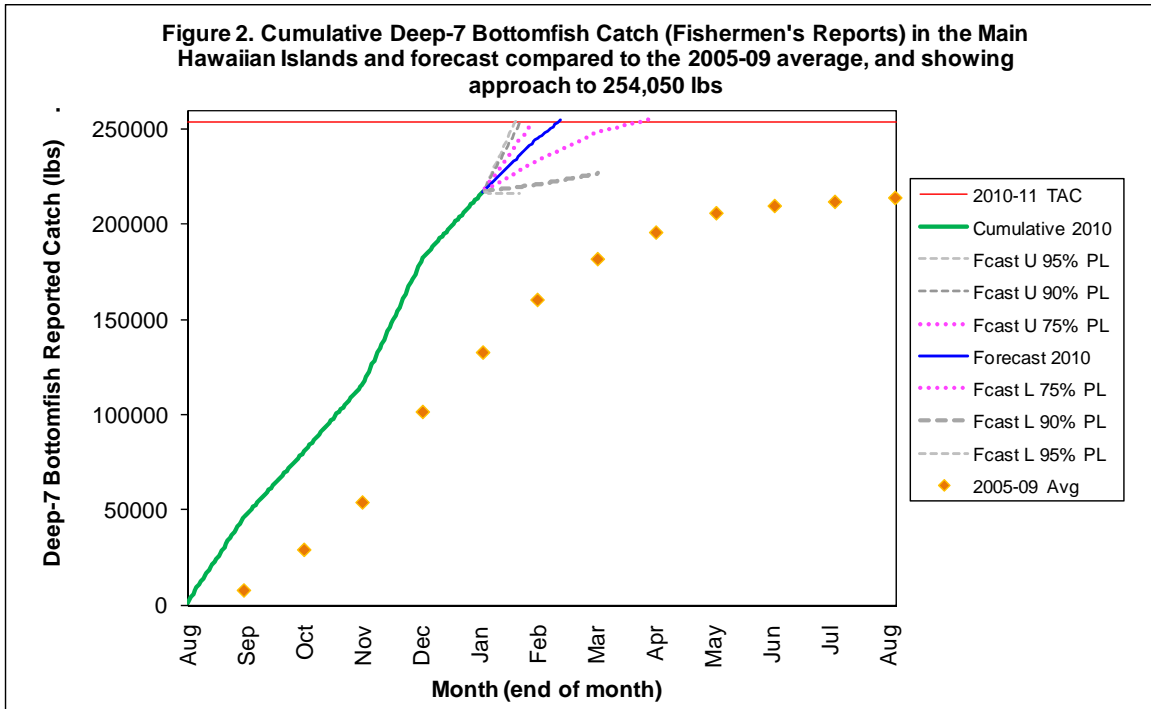
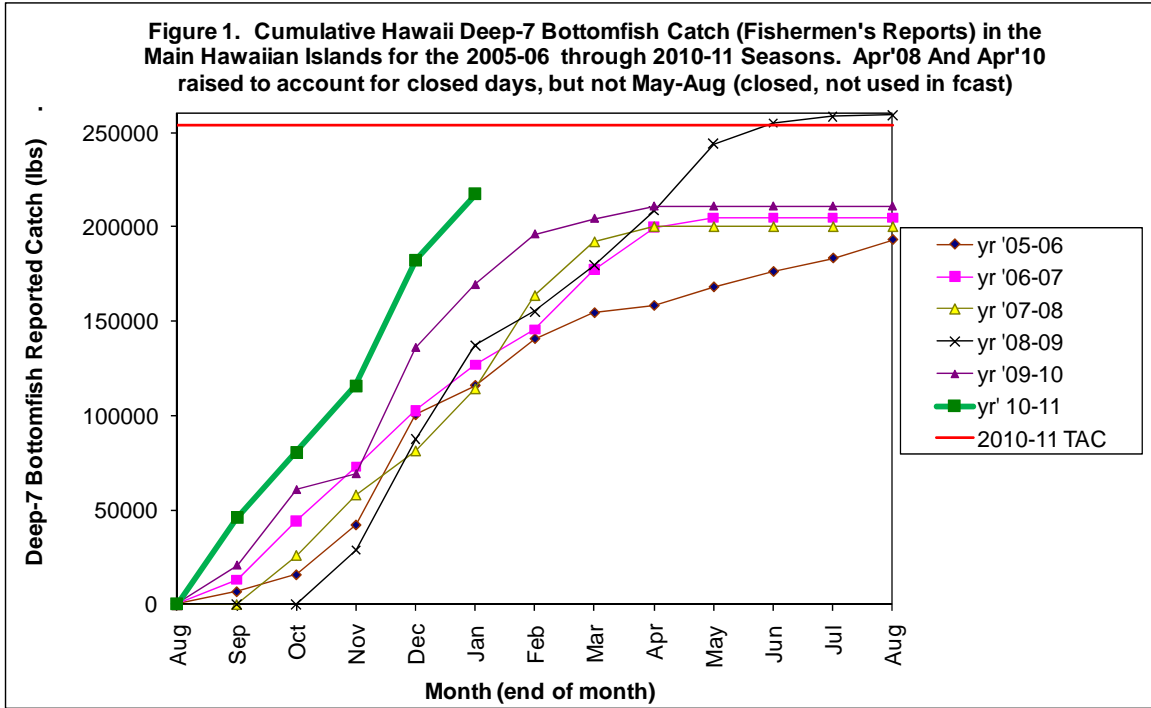


Table 1. Forecast* dates for reaching TAC of 254,050 lbs based on Reports received through				14-Feb-2011
	Starting point (most recent month with fairly complete data):			31-Jan-2011
Risk of exceeding TAC =	5%	10%	25%	50%
[risk of not reaching TAC =	[95%]	[90%]	[75%]	[50%]
Date =	17-Feb-2011	20-Feb-2011	26-Feb-2011	12-Mar-2011
Most recent reliable fishing report total =		217,218	pounds for January 2011	
5-year average (forecast) catch for February		28,263	pounds	
*Forecast cumulative catch by 17 Feb 2011 =		234,378	pounds	
*Forecast cumulative catch by 30 Apr 2011 =		285,203	pounds (if not closed)	
		which is	31,153	pounds in excess of the TAC